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DIOPHANTINE ANALYSIS.

108. Proposed by L. E. DICKSON. Ph. D., The University of Chicago.

The determinant Δ of the special group-matrix for the Quaternion Group equals $\sigma_1\sigma_2\sigma_3\sigma_4(x_1-x_2)^4$, where $\sigma_1=x_1+x_2+2x_3+2x_5+2x_7$, $\sigma_2=x_1+x_2+2x_3-2x_5-2x_7$, $\sigma_3=x_1+x_2-2x_3+2x_5-2x_7$, $\sigma_4=x_1+x_2-2x_3-2x_5+2x_7$. Find the order of the linear group for the $GF[p^n]$, namely, the number of sets x_1, x_2, x_3, x_5, x_7, for which Δ is not equal to 0.

AVERAGE AND PROBABILITY.

133. Proposed by L. C. WALKER, A. M., Graduate Student, Leland Stanford University. Cal.

A circle of unknown radius is drawn with its center at the vertex of a given parabola, and has its greatest area when its circumference passes through the focus of the parabola. Required the average area common to the circle and parabola.

134. Proposed by G. B. M. ZERR, A. M., Ph. D.. Professor of Chemistry and Physics, The Temple College, Philadelphia, Pa.

An ellipse, semi-axes a, b, is placed on a square, side c. Find the chance that center of ellipse is on the square.

MISCELLANEOUS.

130. Proposed by F. P. MATZ, Sc. D., Ph. D.. Professor of Mathematics and Astronomy in Defiance College, Defiance. Ohio.

From a cloud of angular elevation $\phi=45°$, a streak of lightning darted to the earth. The temperature of the atmosphere was $t=80°$, and the percentage of humidity $p=90$. After $m=3$ seconds, the report of the stroke at the earth was heard. How far away from the observer did the streak of lightning (1) start, and (2) strike the earth?

NOTES.

With this number of the MONTHLY begins a new arrangement for its future management which, we hope, will be as thoroughly appreciated by our readers as it is gratifying to us, and which, we are confident, will bring to it increased power and usefulness.

While in Chicago the first of September, we called on Dr. Dickson and urged him to join us in the editorship of the MONTHLY. Not seeing his way clear at the time, he withheld his answer until he could consider the matter. After some meditation, he decided affirmatively.

We feel that we are especially fortunate in securing the coöperation of so valuable a man as Dr. Dickson. He stands in the very front of the younger generation of mathematicians. Though not yet thirty years old, his contributions to mathematics in the way of original and important articles published in the various mathematical and scientific journals of the world is truly marvelous—